An Open Source Software Directory for Aeronautics and Space

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SourceForge

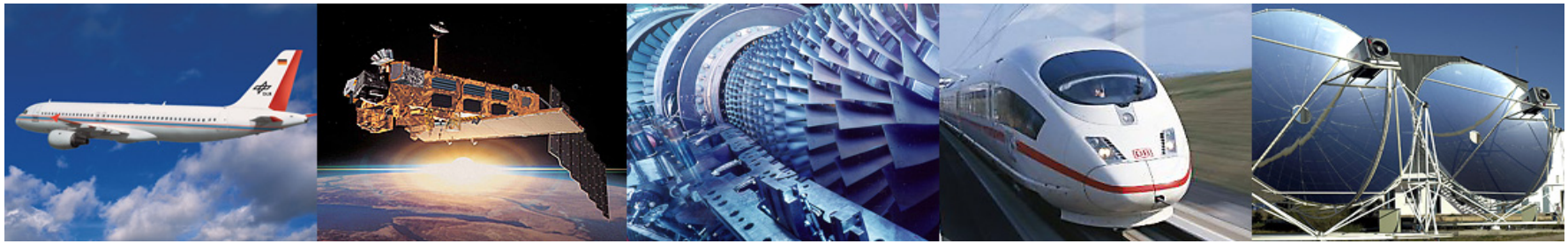
DLR

Outline

- DLR
- Software at DLR
- Software Catalogue
- Allura
- DLR Software Portal

DLR

German Aerospace Center



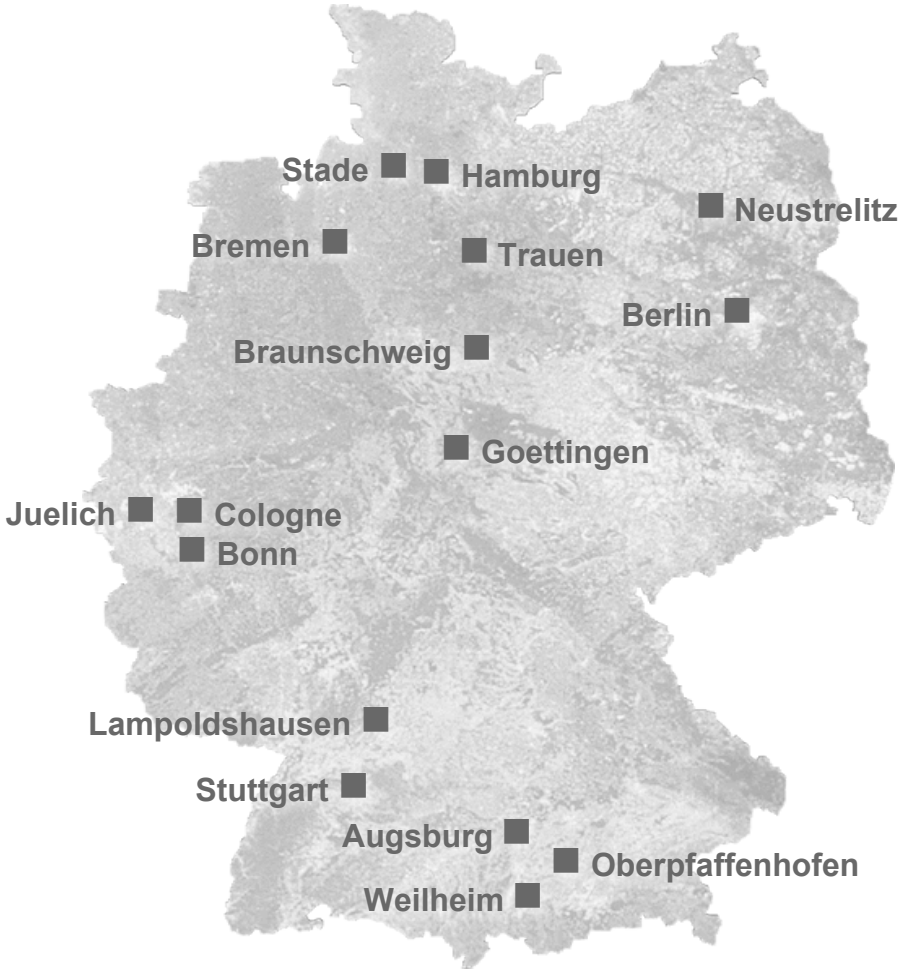
- Research Institution
- Space Agency
- Project Management Agency

DLR
Locations and employees

8000 employees across
33 institutes and facilities at

- 16 sites.

Offices in Brussels, Paris,
Tokyo and Washington.



DLR
Research Areas

Major research areas of DLR institutes

- Aeronautics
- Space
- Transportation
- Energy
- Security

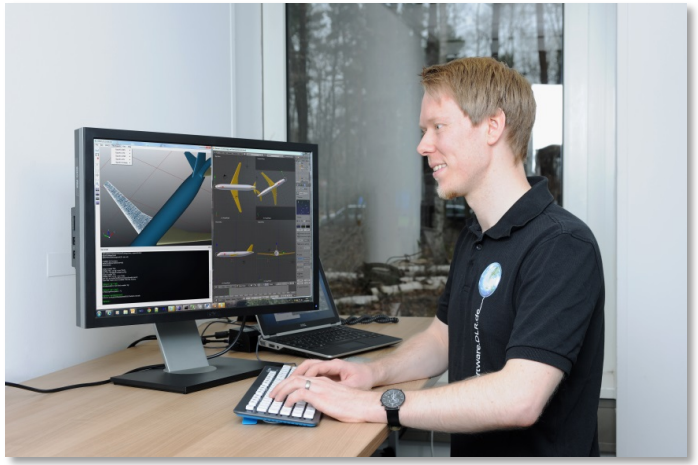
Software research and development

- Simulation and Software Technology division

Software at DLR
Size and Amount

Some numbers…

- More than 1200 employees are developing software
- More than 100 Million EURO personnel costs per year
- DLR is one of Germany largest software developers



Software at DLR
Typical Software in Space and Aerospace

Simulation Software

- High performance computing and scientific computing

Mission-critical software

- Real-time | embedded | decision making software

Supporting software

- Data | Workflow | Knowledge management

Administrative software

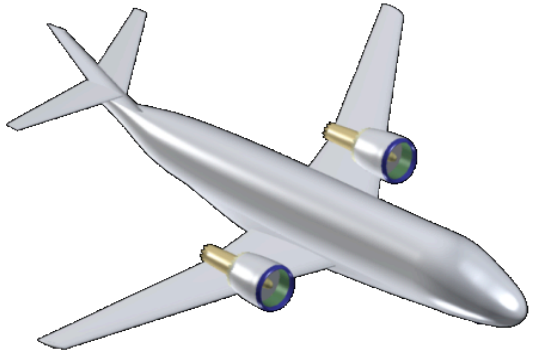
- Web-based intranet software for accounting and project management

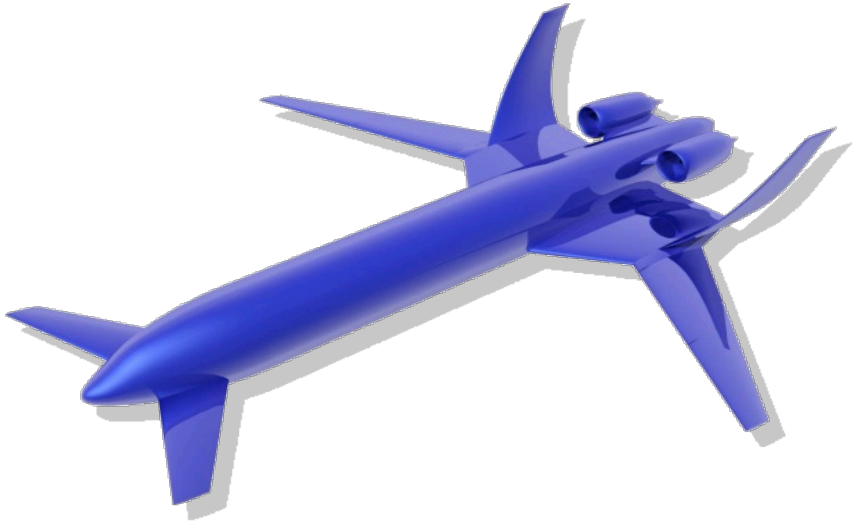
Software at DLR
Characteristics

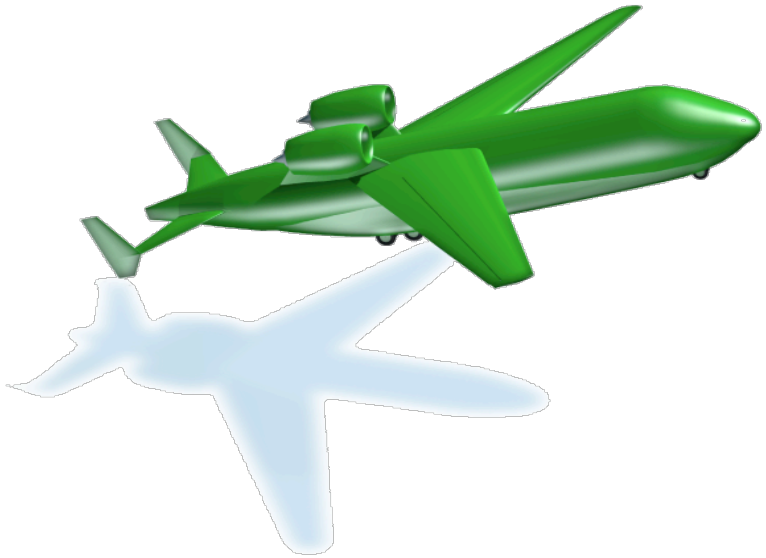
- Most software developed at DLR is non-standard software
- Often very special and specific requirements
- A great many number of software projects
- Open Source or proprietary software licenses
- Overview of existing software is extremely difficult

Example
Future Aircraft Design

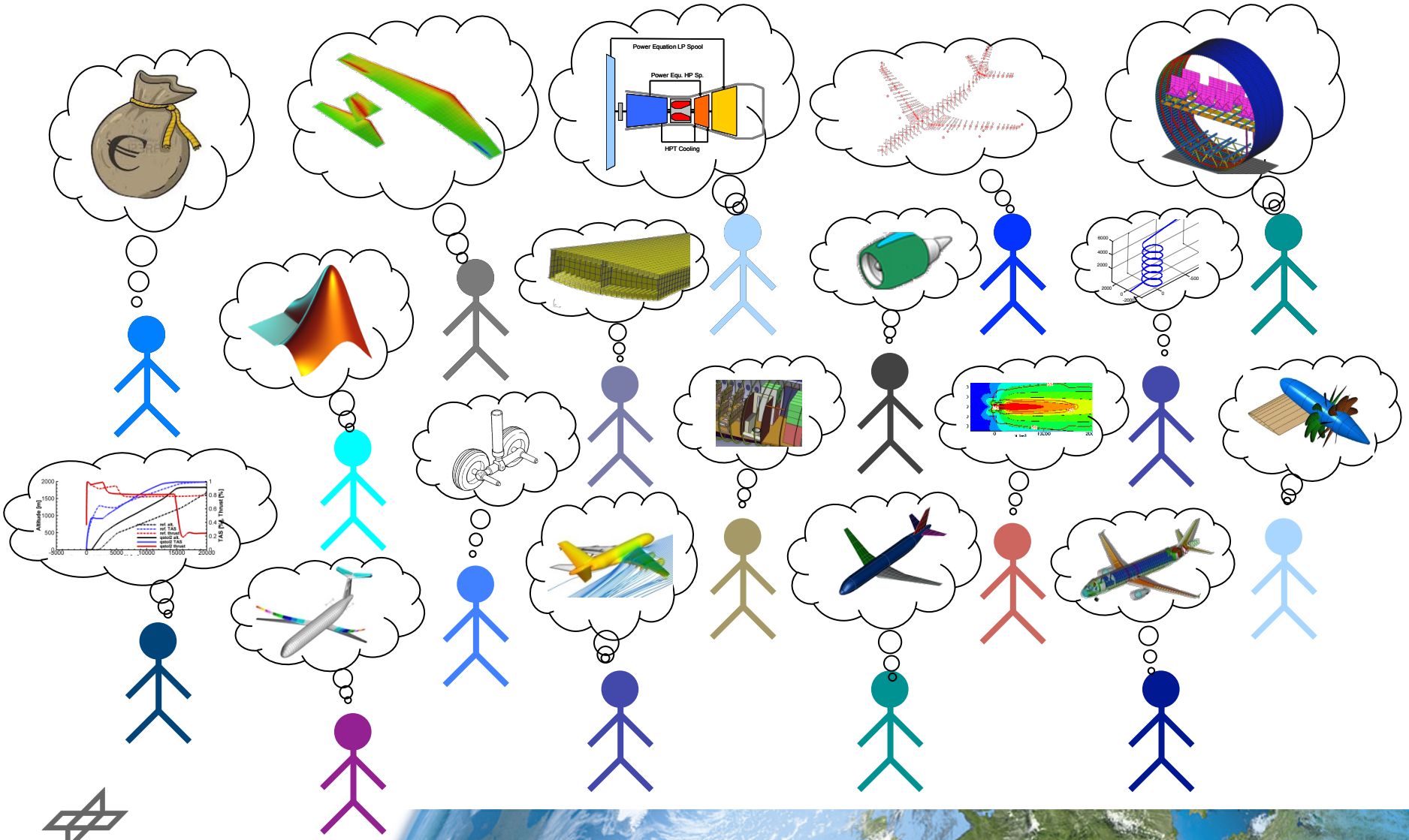
Complex task with many involved scientific and engineering disciplines







Future Aircraft Design



Software Engineering Strategy
Dealing with DLRs Software Characteristics

Methods and Tools

- Development processes tailored for scientists, documentation via Web-based tools
- Development tools seamlessly integrated with working environment
- Tools are available and accessible easily via intranet for every employee
- Standard trainings offered for most important tool chains and software technologies

Software Engineering Strategy
Knowledge Management

Exchange of knowledge and information

- Network of software engineering representatives
  - Information sharing via intranet and workshops
- Wiki for documentation and collaboration
- Question & Answer system (such as *Stack Overflow*)
- Software catalogue

Disclaimer: This list is intentionally not complete!

Software Catalogue
Goal and Essential Requirements

Intention and goal

- Employees can get an overview of all software software packages, tools, and products developed at DLR
- To prevent double development of software

Essential requirements

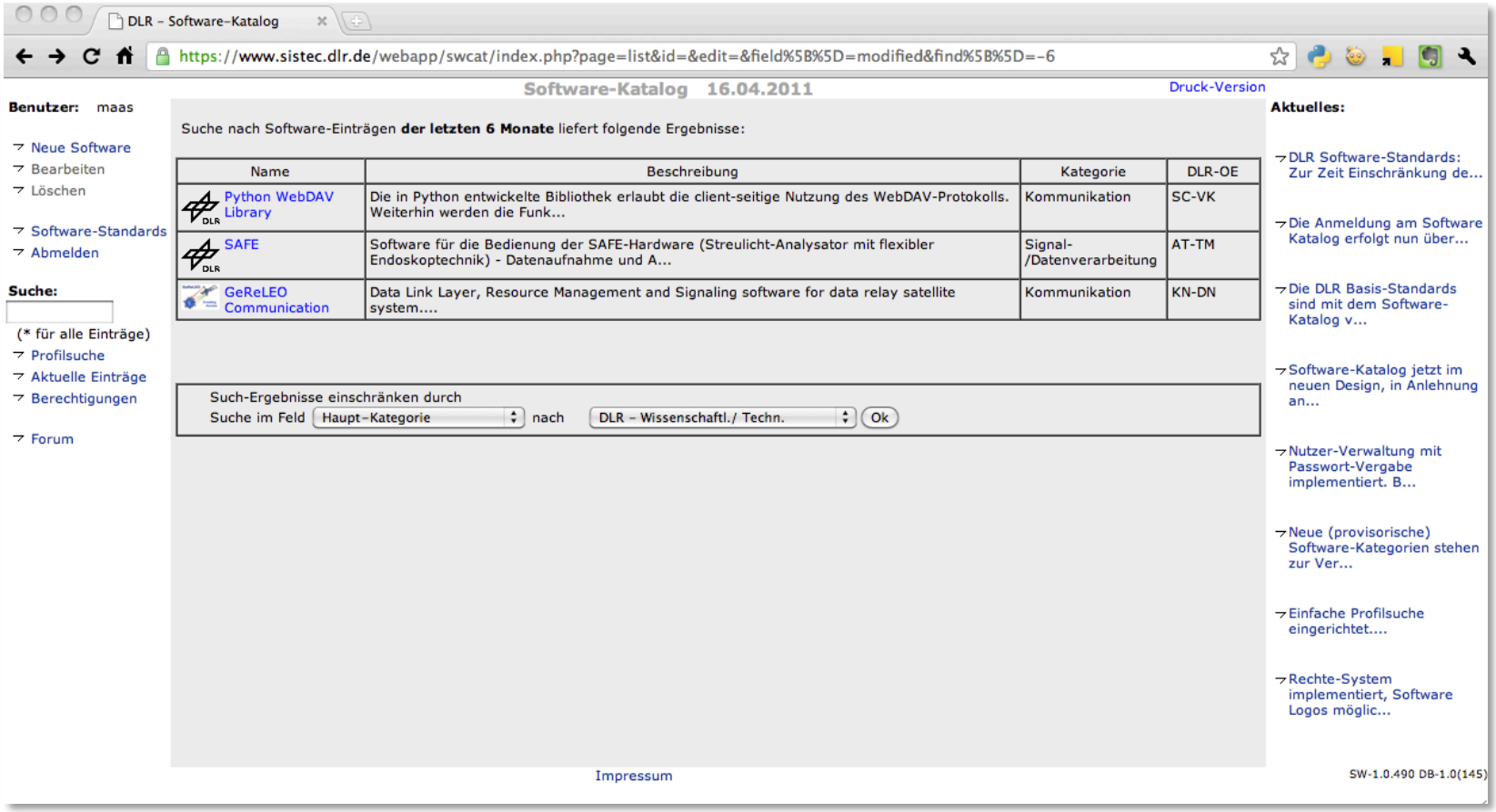
- Searching for existing software
- Browsable directory of all software

Software Catalogue
Major Requirements

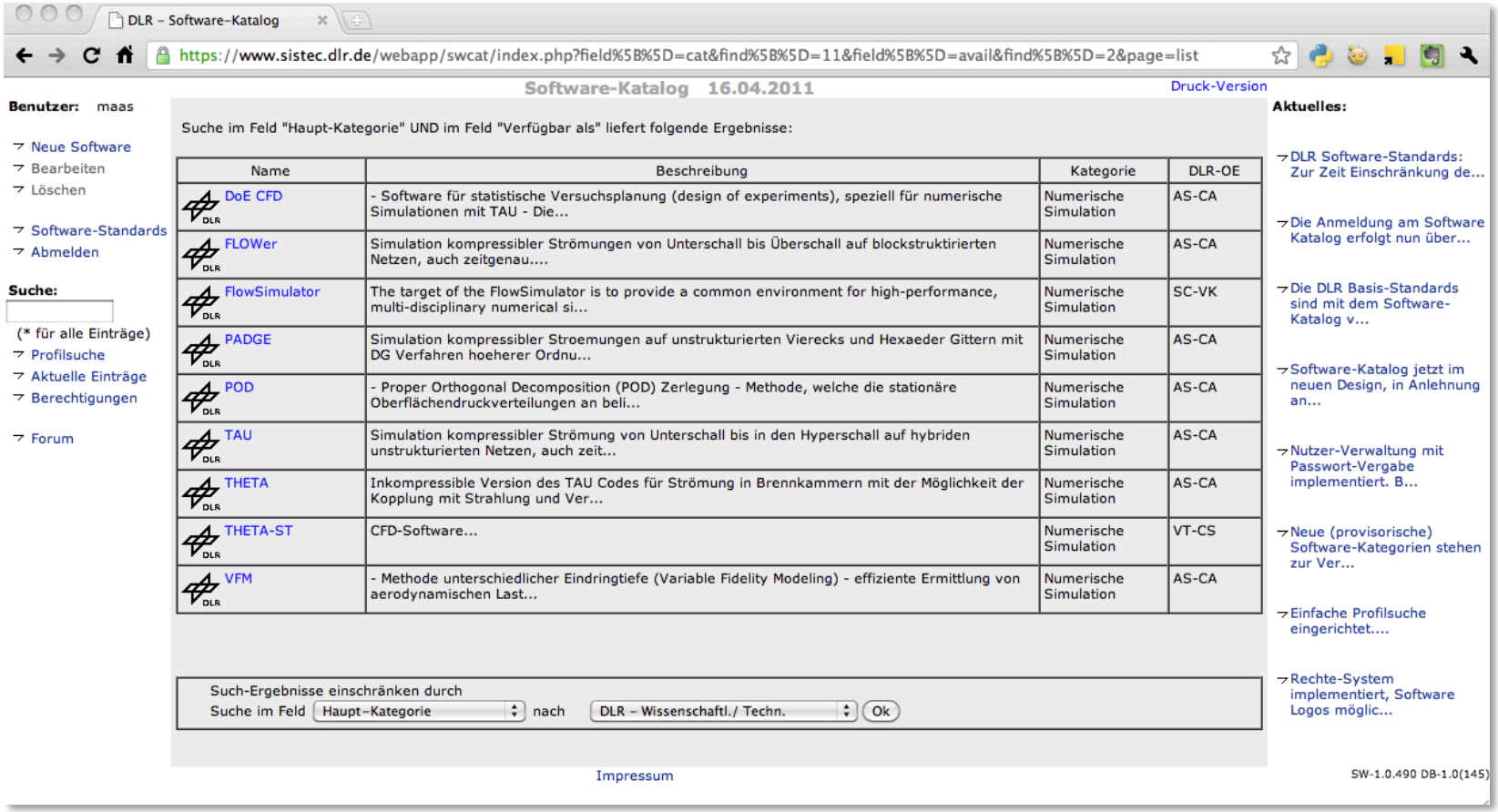
Technical requirements

- Web-based
- Access control
- Basic project information
- Tagging
- Screenshots and diagrams
- Public page
- Code hosting
- Collaboration and documentation
- Commenting and rating
- Social media integration
- Scalability

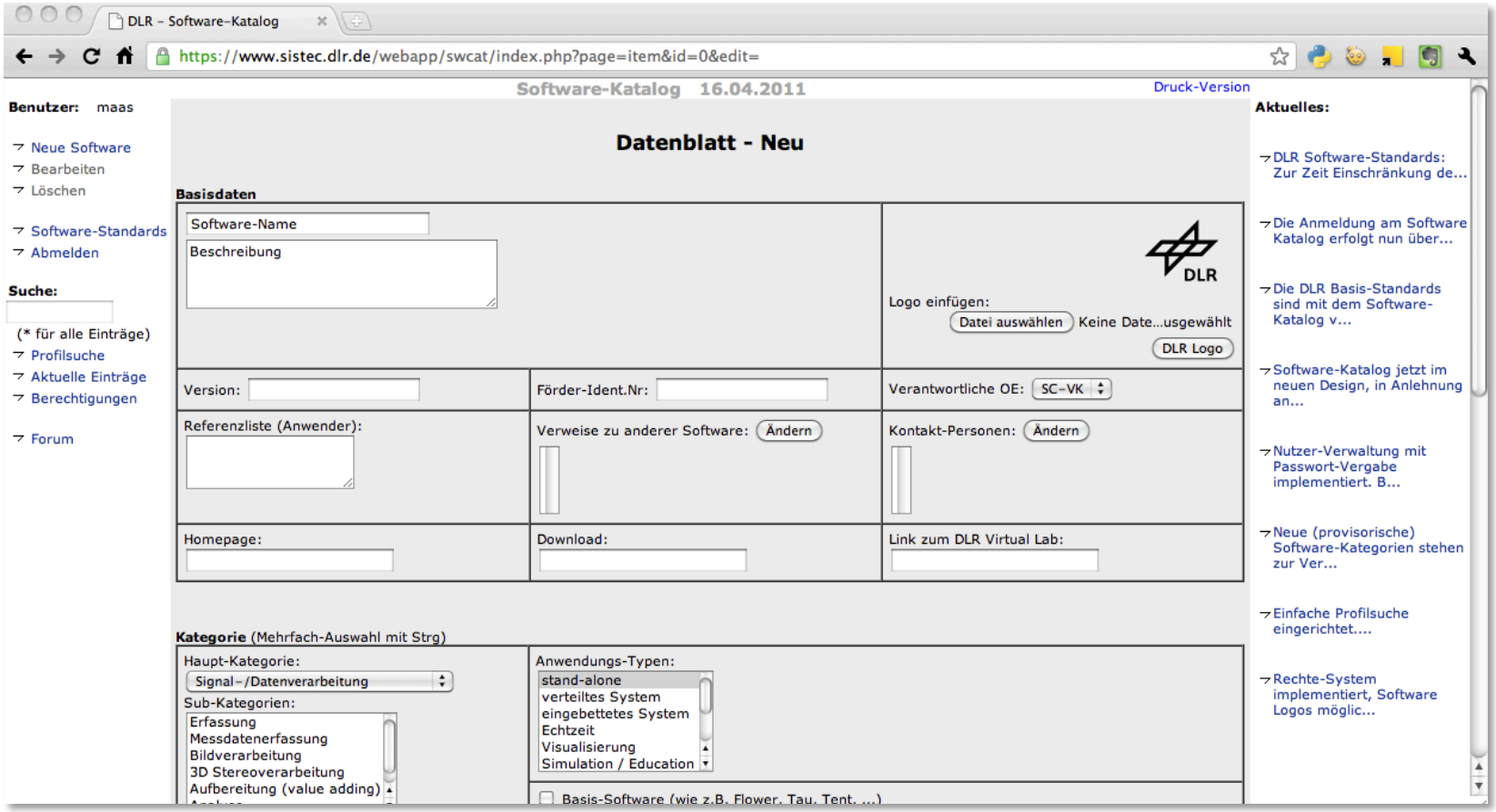
Software Catalogue
First Version



Software Catalogue
First Version



Software Catalogue
First Version



First Version
Problems

Problems of the first version

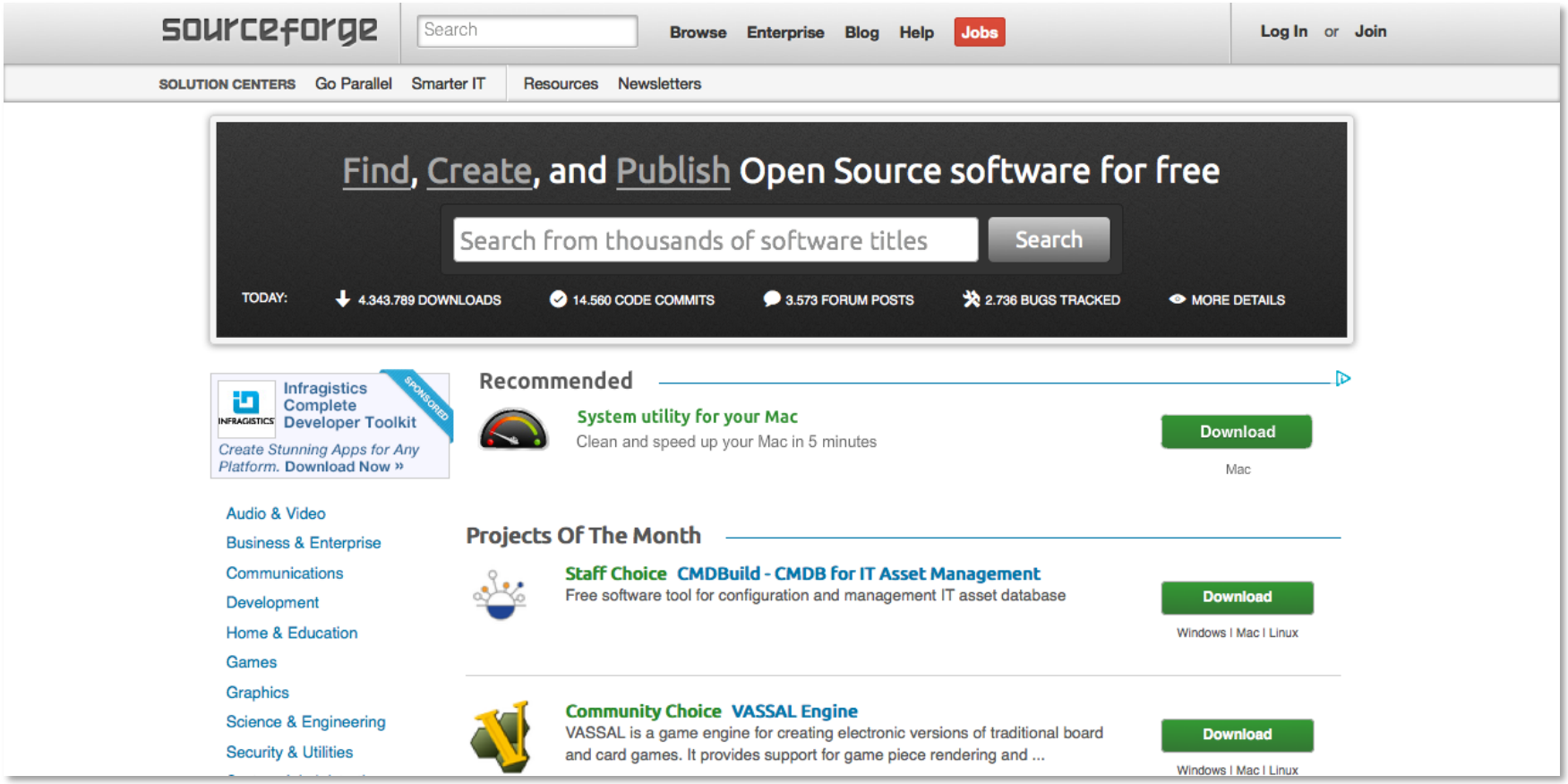
- The solution was not ergonomic
- Employee acceptance was low
- Not suitable for the public
- Code (PHP) not very maintainable

Conclusion

- Development of a new version based on existing Open Source software

→ Apache Allura

SourceForge.net



Apache Allura
The Software behind SourceForge.net

„Forge“ implementation

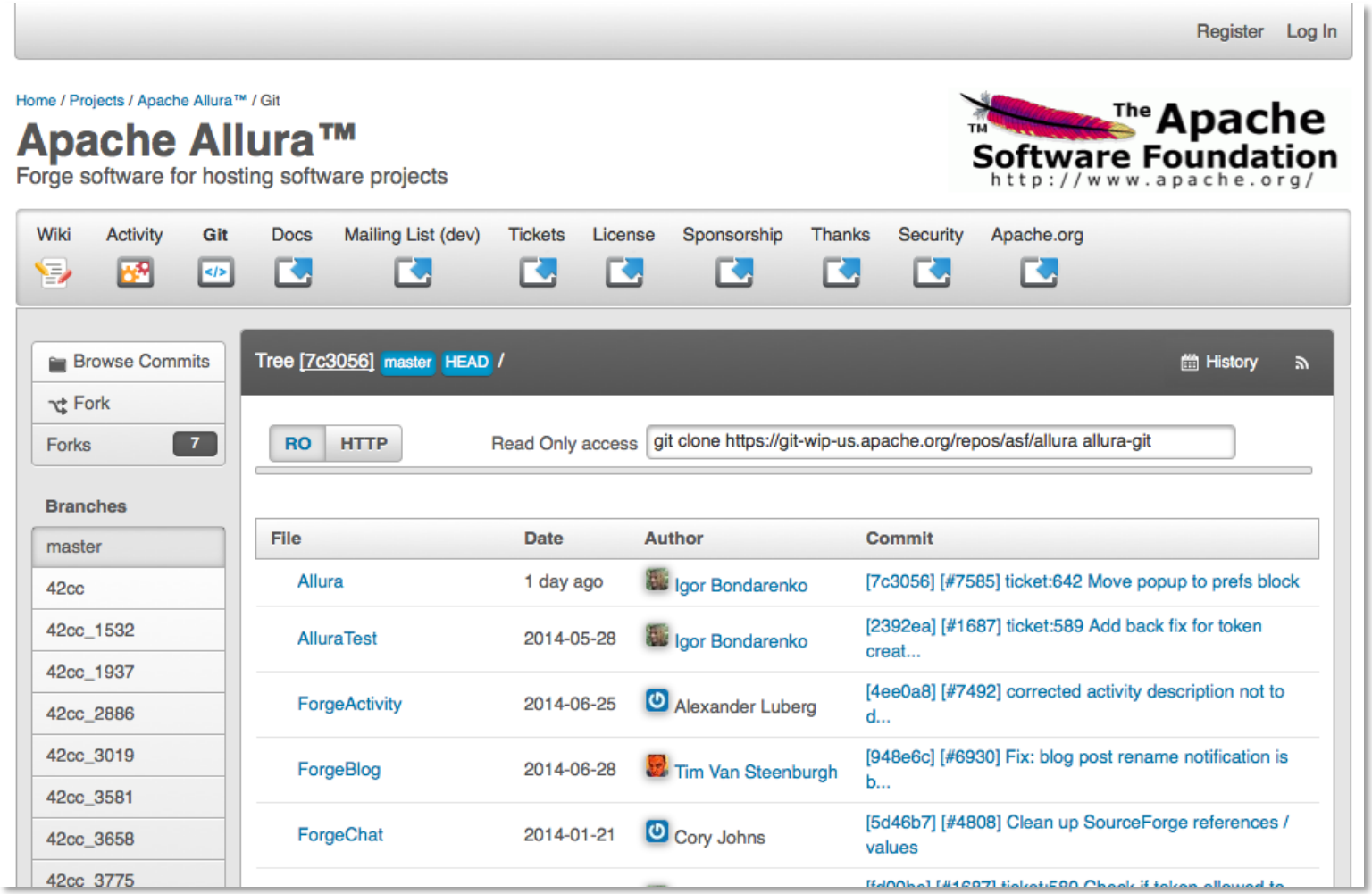
- Source Code Repositories
- Bugs & Issues
- Discussions
- Mailing Lists
- Wiki
- Blogs

Open Source, Apache project since 2013

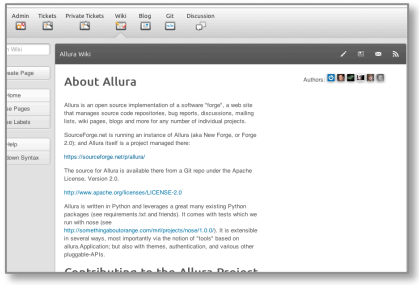
- `https://allura.apache.org`

Allura

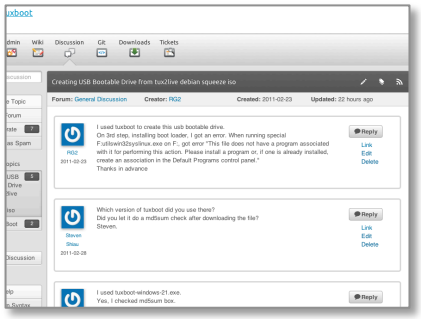
https://forge-allura.apache.org



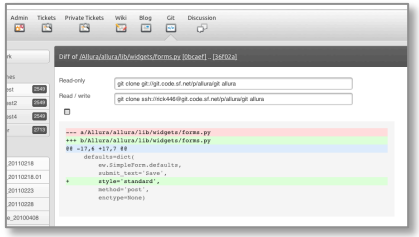
Allura
Integrated Tools



Wiki

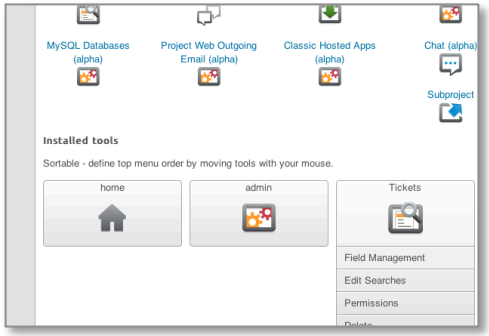


Forum

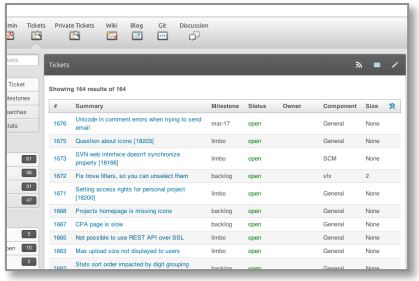


Repositories

Git, Mercurial, Subversion

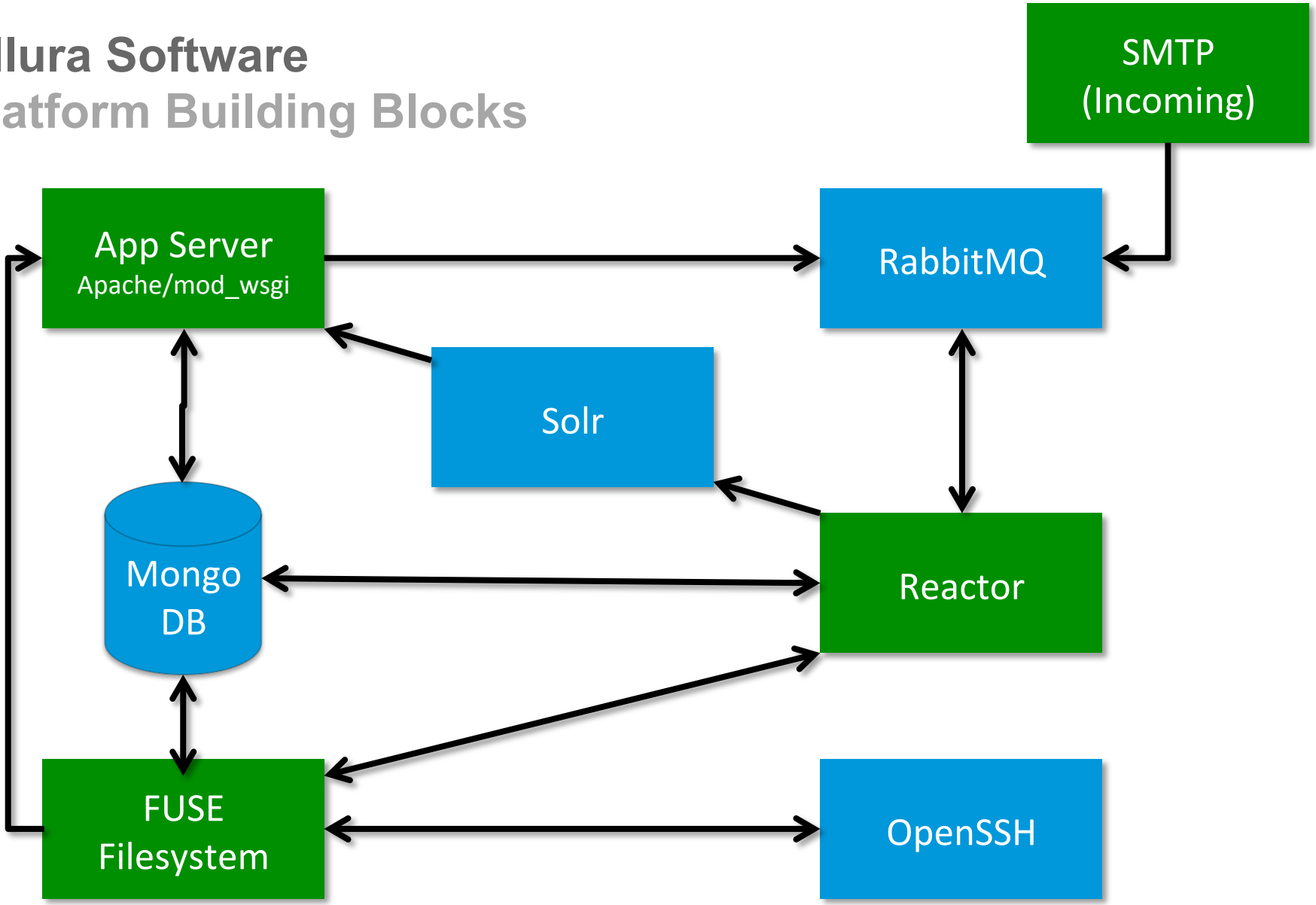


Administration



Tracker

Allura Software
Platform Building Blocks



Allura Software
Components

python powered

WSGI Stack

- TurboGears
- Pylons
- Beaker
- Paste
- WebOb

Rendering

- Pygments
- Markdown
- Jinja2
- FormEncode
- EasyWidgets

Search

- PySolr

Repositories

- GitPython
- Mercurial
- PySVN

DLR

software.DLR.de

Register Log in

DLR

Search here

software.DLR.de

- All projects
- Administration and Tools
- Communication
- Control
- Knowledge and Data Management
- Signal and Data Processing
- Software Engineering
- Simulation and Modeling
- Visualization

Search... Go!

Follow us

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Knowledge and Data Management

BACARDI

The Backend Catalog for Relational Debris Information (BACARDI) is the DLR's approach to a space debris database. The custom middleware components are implemented in Python using ZeroMQ and Protocol Buffer technology.

Simulation and Modeling

Simulation Model Library

Simulation Model Library (SimMoLib) is a distributed system to manage a library of simulation models. SimMoLib's main goal is to promote the preservation of knowledge that lies in simulation and calculation models and encourage reuse of those models.

Simulation and Modeling

Virtual Satellite

Designing space systems and planning space missions relies on many separated phases and dispciplins. The virtual satellite aims at closing the gaps in the development life-cycle and between disciplins by using model-based systems engineering.

DLR Software Portal

http://software.DLR.de

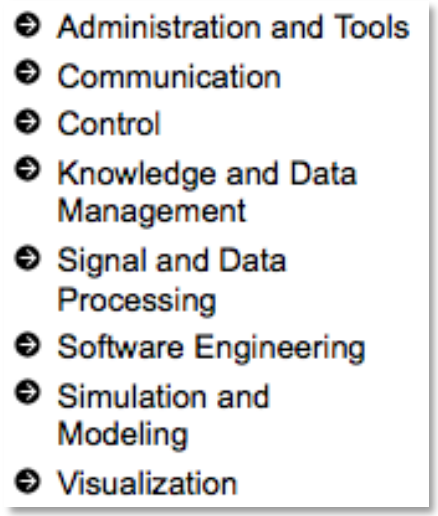
Basics

- Development started in 2011
- Available for DLR employees and the public
- For Open Source as well as proprietary software

DLR Software Portal
Customization

Customization of Allura

- Web templates (DLR corporate design)
- Metadata (project overview and basic information)
- Categories
  - DLR site
  - Development status
  - Institute
  - License
  - Operating system
  - Programming language
  - DLR research program



DLR Software Portal
Rollout

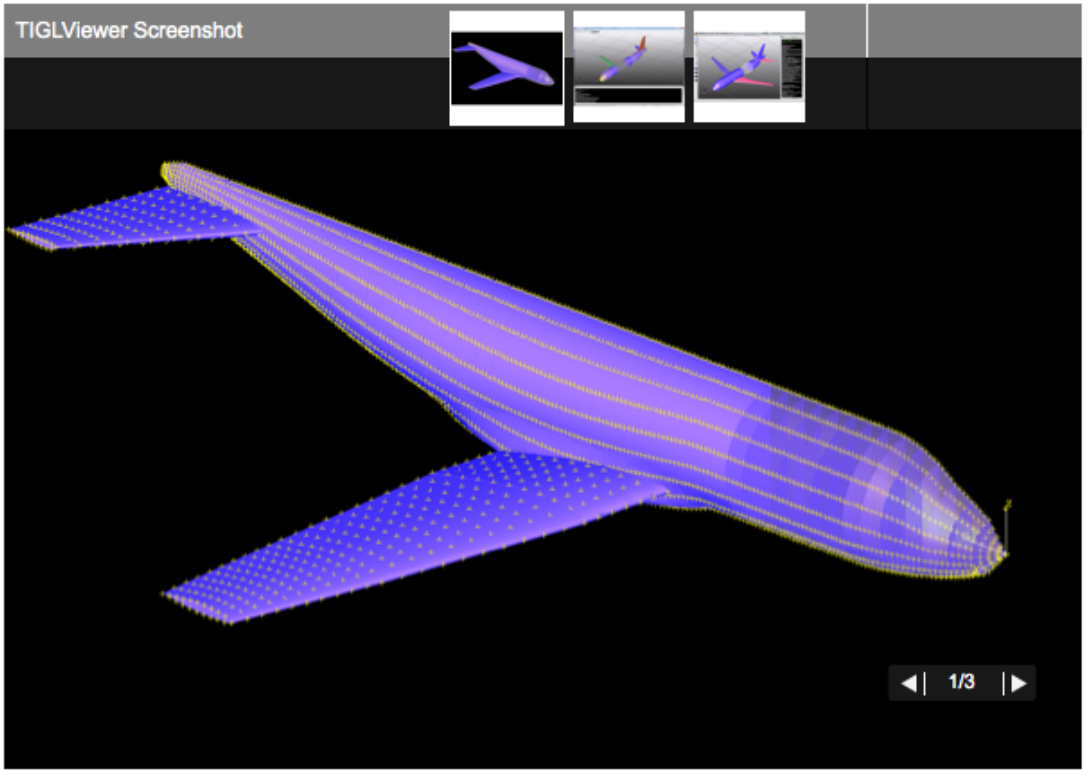
Rollout in four major steps

- [2012:] Open to the public for searching and browsing. Access to add entries for two selected institutes of DLR and for selected users. Code hosting is disabled.
- [2013:] Access to every DLR employee for adding entries. Changed layout for project home pages, project editor, and user profile pages.
- [2014:] Extended features for faceted search and browsing.
- [2015:] Code hosting enabled. Access to registered external users (who must have an account at DLR, which is usually given to project partners or students)

TiGL

Visualization

TIGLViewer Screenshot



The TiGL Geometry Library can be used for easy processing of geometric data stored inside CPACS data sets. TiGL offers query functions for the geometry structure. These functions can be used for example to detect how

License

Apache Software License

Programming Language

C
C++
Python 2
Fortran
Matlab

Development Status

5 - Production/Stable

Operating System

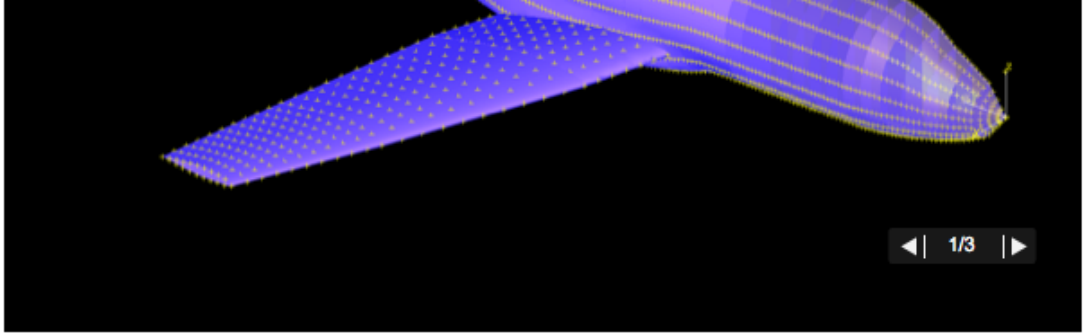
Windows 7
Linux
OS X
Android

Research Program

L - no assignement

Institute

Simulation and Software Technology



Windows 7
Linux
OS X
Android

Research Program

L - no assignement

Institute

Simulation and Software Technology

Site

Cologne

The TiGL Geometry Library can be used for easy processing of geometric data stored inside CPACS data sets. TiGL offers query functions for the geometry structure. These functions can be used for example to detect how many segments are attached to a certain segment, which indices these segments have, or how many wings and fuselages the current airplane conguration contains. This functionality is necessary because not only the modeling of simple wings or fuselages but also the description of quite complicated structures with branches or flaps is targeted. The developed library uses the Open Source software OpenCASCADE to represent the airplane geometry by B-spline surfaces in order to compute surface points and also to export the geometry in the IGES/VTK format. The library provides external interfaces for C, C++, Python, MATLAB and Fortran.

For more information, please visit out project page on http://tigl.googlecode.com .

Twitter Facebook Google+	Print Send	Last update: 2013-08-21

Project resources	Project members
Project homepage Support homepage	Siggel, Martin

German Aerospace Center

software.DLR.de
» Projects
» TiGL

- Metadata
- Homepage
- Screenshots
- Categorization
- Permissions
- Usergroups
- Audit Trail

feedback & support

Project Setup

Please set up and update all information for your project.
Important: **Don't forget to set and maintain correct permissions!**

Basic Project Information

Metadata	Update basic project metadata, such as project name, links to other websites, a short summary of your project, the software category, and the icon. (**Info:** You can also remove your project here.)
Homepage	Provide a solid description, so colleagues can figure out what the project is all about.
Screenshots	Add as much screenshots, pictures, and diagrams as you like.

Categorization

Categories	Categorize your project. Currently, you can categorize according to license, programming language, and DLR research program.

Access

Permissions	Set permissions to groups for reading, updating, administrating or creating project content.
User groups	Manage user groups for your project.

History

Audit trail	Show all changes on the project information.

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DLR

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» Projects
» TiGL

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feedback & support

Metadata Project Overview and Basic Information

Name
TiGL

This is the publicly viewable name of the project, and will appear on project listings. It should be what you want to see as the project title in search listings.

Category
Simulation and Modeling

Summary
A library for generating 3D geometries from parametrized CPACS/XML data sets

174 characters left

Add a short one or two sentence summary for your project.

Homepage
http://code.google.com/p/tigl/

The homepage of your project where people can find extensive documentation, downloads, presentations etc.

Support page
○ None
◉ URL http://code.google.com/p/tigl/

Icon

Delete Icon or replace: Durchsuchen... Keine Datei aus

DLR

software.DLR.de
» Projects
» TiGL

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feedback & support

Categorization Categories of the Project

DLR site

DLR site :: Cologne

Augsburg

Add

Development Status

Development Status :: 5 - Production/Stable

5 - Production/Stable

Add

Institute

Institute :: Simulation and Software Technology

Design Organisation

Add

License

License :: OSI-Approved Open Source :: Apache Software License

OSI-Approved Open Source

Academic Free License (AFL)

Add

DLR

DLR Software Portal
Current State

- Open for all DLR institutes
- First set of projects added
- Adding projects not mandatory yet
- Feedback by project owners
  - Many bugs and feature requests
  - New contacts within DLR and with external companies

DLR Software Portal
Current and Future Work

Technical

- Upgrade to latest version of Allura
- Faceted search
- Activation of code hosting

Organizational

- Engage DLR employees to add their projects
- Extend access to other organizations (ESA, NASA, …)

Thank You!

Questions?

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www.dlr.de/sc | @DLR_software | @onyame

DLR